

# The experiments of seed germinating of *Dioscorea nippnica* Mak

LI Jing-hua (李景华)\*

(Jilin Military Medical College of The Fourth Military Medical University, Jilin 132013, P. R. China)

LI Gong-bin (李公斌)

(Northeast Forestry University, Harbin 150040, P. R. China)

LIU Chang-min (刘昌敏)

(Shandong Timber Industry Group Co., Jinan 250000 P. R. China)

**Abstract:** *Dioscorea nippnica* Mak is an important traditional Chinese medicinal material with significant economic value. Seeds of *Dioscorea nippnica* Mak were collected from three forest areas. Germination experiment was carried out with three mediums. Experimental results showed that the species had lower percentage of germination on all mediums. The limiting factors for germination were analyzed.

**Key word:** *Dioscorea nippnica* Mak; Seed; Seedling; Germination

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## Introduction

*Dioscorea nippnica* Mak is an important traditional Chinese medicinal material with significant economic value. In recent years, as impact of resources exploitation against *D. nippnica*, its population distribution and amount of growing stock have decreased constantly. As a result, this species has been listed at national second rank preserve plants (Xie 1995). It is urgent to survey the resources and study its endangered mechanism of *D. nippnica*.

Species survival rely on reproduction, and every species has a special reproductive strategy. In advanced plants, there are two reproductive ways in common, sexual propagation and asexual propagation. In natural conditions, it is a key phrase for seed plant to transform from seed into seedling. This process of transformation relates directly with whole population vicissitude. *D. nippnica* mainly depends on root-stock asexual propagation, but sexual propagation is also a very important complement to it. Sexual propagation reproduces offspring by gene recombine, with higher genetic diversity, which could improve genetic quality and make offspring population have genetic variety, as a result, the adaptability of species to different environments is raised and the stability and expanding of whole population is ensured.

## Method

### Seed collecting

Seeds were collected mainly from Sanchazi Forestry Bureau of Jilin Province and Liangshui National Reserve of Northeast Forestry University, Heilongjiang Province, and a little from Maoershan Experiment Forestry Farm of Northeast Forestry University. The seeds from different areas were mixed.

### Experimental conditions

Collected seeds were dried by airing. Measured 1000-seed weight was 10.978 g, which shows that *D. nippnica* seed is lighter, easily spread by wind. Fruiting part of *D. nippnica* was at 1.5-2.5 m above ground. Seeds could spread as long as about 15 m by wind (Li 1996).

1800 ripe, plump seeds were picked out, divided equally into two groups, and comparing experiments were conducted at different temperatures (Table 1). The mediums of loam, sand and damp gauze were used in this experiments.

## Results and discussion

The results of experiment indicate that seed percentage of germination and seedling transformation rate were very low under cultivated conditions. Temperature, changing from 15 to 25, has little effects on seed percentage of germination (see Table 1). The percentage of germination showed great difference in three kinds of mediums. This maybe caused by different pH values of medium. There are many reasons

**Biography:** \*LI Jing-hua (1969-), male, assistant, Jilin Military Medical College of The Fourth Military Medical University, Jilin 132013, P. R. China

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for lower percentage of germination.

*D. nippnica* seed is harden, and its testa has poor water permeability. It can't absorb water, even though at appropriate temperature and humidity (Liu 1996). This character appeared quite clear in the course of experiment. 600 seeds on damp gauze medium hardly germinated. This is resulted from that the testa has a thick layer, closely ranging palisade, singularly thicken ektextine, which contains pectic material that can dehydrate rapidly and is irreversible in adverse conditions. The other reason for poor permeability is that the omphalodium is small and blastopore is occult.

The observation on seed germination of *D. nippnica* shows that when nutrient for radicle growth

was used up gradually in cotyledon, the radicle emerge through testa from the micropyle, at the same time, hypocotyls elongate and cotyledon comes out of testa up to soil surface, testa remains in soil, then cotyledon spreads rapidly in heart-shaped or inverse oval-shaped and becomes from yellow-green to green.

In addition, the lower 1000-seed weight (10.987g/1000) *D. nippnica* implies that seed contains less nutrient, which has a great influence on germination, seedling growth, and adaptability to adverse environment (Wang 1993).

The other factors affecting seed germination, such as temperature, moisture contents of soil and sowing depth are needed further study.

**Table 1. Experiment results of seed germination for *Dioscorea nippnica* Mak**

Temperat ure(℃)	Seed num- ber	Medium	pH	Days for first seed germi- nation	Days for last seed germi- nation	Germinated seed number	Percentage of germina- tion (%)	Seedling number	Transforma- tion rate (%)
15	300	Damp gauze	0.71	11	13	2	0.67	0	0
	300	Sand	0.67	9	21	53	17.67	35	11.67
	300	Loam	0.62	10	24	98	32.67	91	30.34
25	300	Damp gauze	0.71	9	12	3	1.00	0	0
	300	Sand	0.67	7	16	55	18.33	36	11.99
	300	Loam	0.62	7	18	96	32.00	90	30.00

Note: Transformation rate is seedling number divided by seed number.

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